

Things to look for

- 1) Unaltered, Whole-Brain Activation Maps
- 2) Average MR Timeseries from Regions of Interest
- 3) Maps from Multiple Individual Subjects
- 4) Random-Effects Group Maps
- 5) Behavioral Data
- 6) Clear explanation of the analysis, especially statistical tests

Things to look for

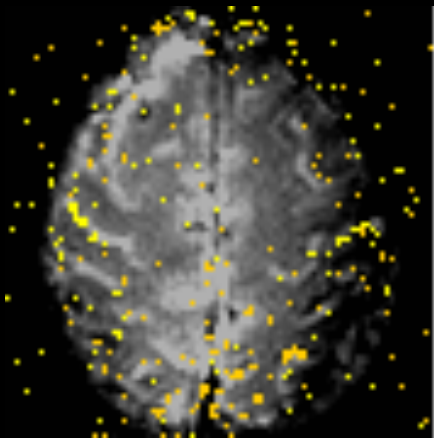
Unaltered, Whole-Brain Activation Maps

Common deception techniques:

Using different thresholds for different regions (low where you want to see activity, high where you don't)

Photoshop-ing (or otherwise eliminating) regions with activity you don't want to explain

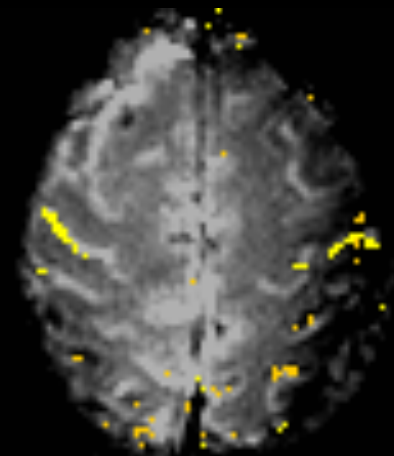
Poor Quality Data



What the authors
actually show you



Good Quality Data



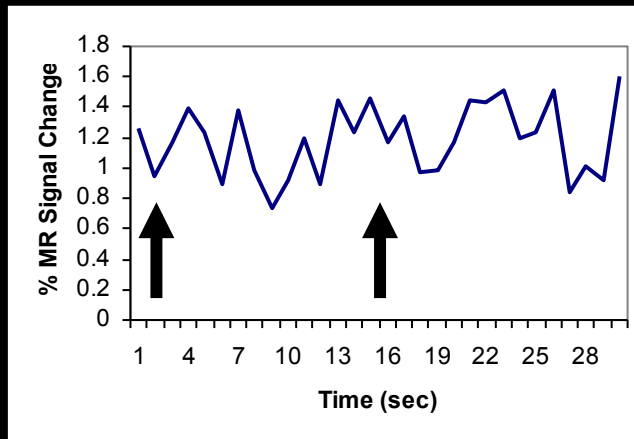
Things to look for

Average MR Timeseries from Regions of Interest

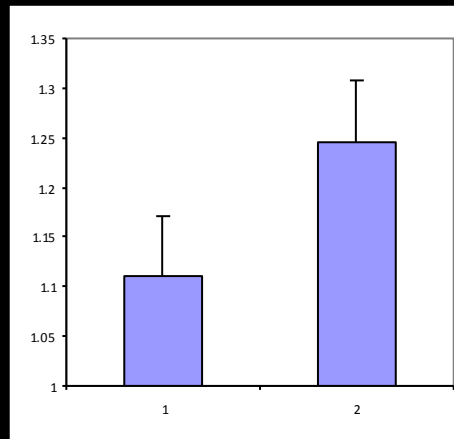
Common deception techniques: Showing bar graphs, t-statistics, curve fits to the data (especially SPM) or any other method to avoid showing the actual MR data

Arrow indicates stimulus onset—note that histogram is actually generated from mean +SD of poor quality data!

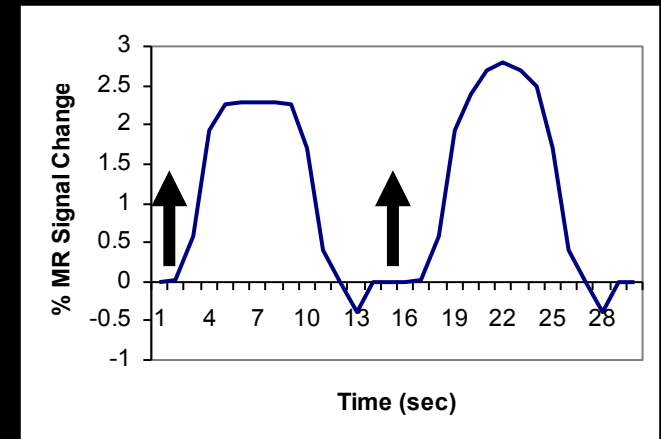
Poor Quality Data



What the authors actually show you



Good Quality Data



Things to look for

Maps from Multiple Individual Subjects + Random-Effects Group Map
(random effects better captures variability across subjects;
conjunction and other techniques hide it)

Poor Quality Data

S1



S2



S3



What the authors
actually show you

Average Map
(Conjunction
Technique)



Good Quality Data

S1



S2



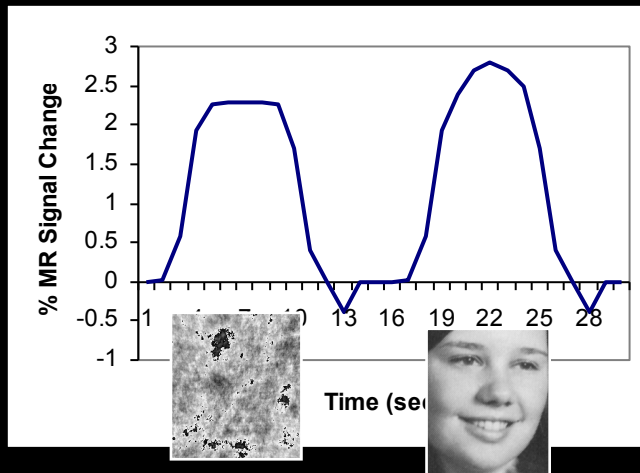
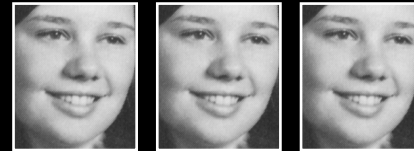
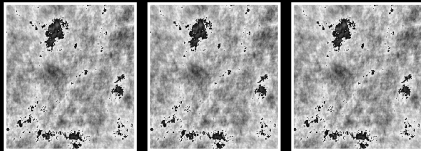
S3



Things to look for

Behavioral Data

Poor Quality Experiment: Different Stimuli, No Task

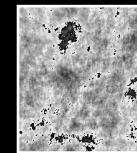


Is this because...

Neurons like



not



OR

The subject
was less alert



Things to look for

Clear explanation of the analysis, especially statistical tests

Many ways to analyze fMRI data → if you try enough ways you will find SOMETHING; therefore, essential to know exactly what the authors have done.

Most egregious example:

“The data was analysed using SPM 99”

(fMRI methods section in its entirety)